

REMARKS

Claims 6, 8, 9, and 11 have been amended for clarification purposes and claims 12-17, 19, 26-27 and 30 have been canceled. New claims 34-47 have been added. These amendments are not intended to narrow the scope of these claims. The claims have been rewritten to place them in better form for examination and to further obviate the 35 U.S.C. §112 rejections set forth in the Office Action dated January 2, 2003. It is believed that none of these amendments constitute new matter. Withdrawal of these rejections is requested.

Claims 6, 8-11, 13-14, 16, 27 and 30 are rejected under 35 U.S.C. §112, second paragraph as being indefinite. Specifically claim 6 is rejected as indefinite because the metes and bounds of a "genetic factor is unclear. Applicant has amended claim 6.

Claim 8 is indefinite because "cells or tissue culture of regenerable cells" lacks proper antecedent basis. Applicant has amended claim 8 as suggested by the Examiner.

Claim 9 is indefinite in the recitation "is capable of expressing". Applicant has amended claim 9 as suggested by the Examiner.

Claim 11 is rejected for improper dependency of "second said parent". Claim 11 has been amended as suggested by the Examiner.

Claim 17 is indefinite for failing to recite the steps for identifying the inbred parent plants. Applicant has canceled claim 17.

Claim 19 remains rejected as the metes and bounds of what is retained in "RAA1-derived" corn plants or progeny is unclear. Applicant has canceled claim 19.

Claim 30 is rejected as indefinite for lack of a positive method step by which one could practice the claimed method. Applicant has canceled claim 30. Withdrawal of these rejections is respectfully requested.

Claims 6, 17, 26, 27 and 30 have been rejected under 35 U.S.C. §112, first paragraph as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected to make and/or use the invention. Applicant has amended claim 6 and canceled claims 17, 26, 27 and 30. Withdrawal of this rejection is respectfully requested.

The Examiner has rejected claims 11-16, 19, 26-27 and 30 under 35 U.S.C. §112, first paragraph as containing subject matter which was not described in the specification in such a way as to convey to one skilled in the art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

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Assignee, Limagrain Genetics Grande Cultures presents its views in support of new claims 34 and 35 as well as reasons for canceling claims 19 and 30:

"A plant variety as used by a person skilled in the art of plant breeding means a plant grouping within a single botanical taxon of the lowest known rank which can be defined by the expression of the characteristics resulting from a given genotype for an inbred variety or combination of genotypes for an hybrid variety.

An inbred variety, or inbred line, has been created through multiple cycles of self pollination and is therefore considered a homozygous line. The genome of such a line has identical alleles for all loci of homologous chromosomes and contains the same linear sequences of genes, each gene being present in duplicate.

As long as the line is self pollinated, the genome is stable and remains identical from generation to generation. Similarly, the genotype being expressed through the phenotype, as long as the arrangement and the organization of the genes remain stable through strictly controlled self pollination, the phenotype will remain stable as well. The same characteristics will then be expressed from generation to generation and will therefore be predictable.

The inbred line is a combination of phenotypic characteristics issued from an arrangement and organization of genes created by a person skilled in the art through the breeding process. Claims on inbred lines per se relate to this invention.

A hybrid variety is classically created through the fertilization of an ovule from an inbred parental line by the pollen of another, different inbred parental line. Due to the homozygous state of the inbred parental genome, all gametes, whether pollen or ovules, produced by a given inbred line will carry a copy of each parental chromosome and be therefore genetically identical carrying a copy of every gene as arranged and organized in the original genome of the parental inbred line.

Therefore, both the ovule and the pollen bring a copy of the arrangement and organization of the genes present in the parental lines. The genome of each parental line is present in the resulting hybrid (also known as F1 hybrid) in the same arrangement and organization as created by the plant breeder in the original parental line. The cross between two different inbred parental lines is therefore predictable, it will contain fifty percent of the genome of each inbred parental line. In addition, and as long as the homozygosity of the parental lines is maintained, the resulting hybrid cross will be stable, whether genetically or phenotypically.

The F1 hybrid is a combination of phenotypic characteristics issued from two arrangement and organization of genes, both having been created by a skilled artisan/plant breeder through the breeding process. Each arrangement and organization of the genome is present in the F1 hybrid as it has been created by the breeder in the inbred.

For a plant breeder skilled in the art of corn breeding, the creation of an F1 hybrid is therefore highly predictable. For example, dominant alleles present and expressed in an inbred line, will be brought by the gamete and expressed by the F1 hybrid. Therefore claims 36 and 37 meet the provisions of 35 U.S.C. §112.

When an F1 hybrid variety is used for further breeding, as mentioned in canceled claims 19 to 25, also known as "progeny claims" or in the breeding methodologies of canceled claims 28 to 30, the situation changes. The genome of an F1 hybrid is composed by a copy of the genetic maternal

material, bought by the ovule and a copy of the genome of the genetic paternal material, bought by the pollen. The genome of the F1 hybrid can be reproduced by crossing the inbred parental lines and is identical as long as the homozygosity of the inbred parental lines is safeguarded.

However, when the F1 hybrid itself produces gametes, the phenomenon that takes place during the meiosis will lead to gametes that are different and totally unpredictable in the arrangement and organization of the genes carried out. As a result, the F2 generation, whether produced by auto-pollinating the F1 hybrid (the pollen produced by F1 hybrid fertilizes the ovule produced by the same F1 hybrid) or by inter-crossing two different F1 hybrids (the pollen produced by one F1 hybrid fertilizes an ovule produced by another, different F1 hybrid), will be genetically and phenotypically different from one resulting F2 plant to another and also from the parental F1 hybrids. Similarly, subsequent generation, usually known by a man skilled in the art as F3, F4, F5, ... Fn or "progeny", will be from one generation to the next, more and more genetically and phenotypically different because of the increasing number of meiosis phenomenon.

First, due to the chromosome recombination, the gametes created through the meiosis will have an arbitrary content of maternal or paternal origin of the chromosomes. The different chromosomes segregating independently, the gametes will all have the same number of chromosomes, but with a different ratio of maternal or paternal origin. This part of the meiosis only will lead to gametes, whether ovules or pollen, that have different genetic content. The larger the number of chromosomes, the more chromosomal recombination occurs.

Second, and in addition, the homologous recombination process will lead to the exchange, also known as crossing over of numerous DNA regions by their homologous DNA sequences from the homologous chromosome. This second part, resulting from the exchange between chromatids paired chromosomes, will complete the melange of the genes and lead to gametes

that definitively have different genetic background. The genes are randomly rearranged and the genetic information carried by the gamete is then totally unpredictable.

As long as both copies of the chromosome have the same information, as it is the case for an inbred, these phenomena do not lead to any changes in the genomes and all gametes produced are identical.

But for progeny from an F1 hybrid which chromosomes copies originate from different inbreds, both processes will lead to different gametes, having parts of their genome originating from one inbred, other parts originating from the other inbred.

Therefore the arrangement and organization created by the plant breeder in the original parental line, that was also present in the F1 hybrid is lost when the gametes from the F1 plant are produced. The arrangement and organization of the genome in the gamete, but also in the subsequent F2, F3, F4, Fn and progeny generation plant produced through fertilization and development of the embryo is completely random.

Therefore, as the arrangement and organization created by the plant breeder in the original parental line is lost, the phenotypic expression of said genetic organization is lost and the F2, F3, F4, Fn plants, seeds and progeny after the initial F1 hybrid are different from the original inbred and F1 hybrid. There is no way to predict what can be the outcome of such a progeny, what can be its genetic organization or how this organization can be expressed by the plant. As the integrity of the arrangement and organization of the F1 genome is no longer present in the F2, successive generations and progeny, as the genomic organization and the phenotypic expression resulting thereof are completely unpredictable. Given the predictability, for a plant breeder skilled in the art of corn breeding, to create an F1 hybrid by crossing two inbred lines, therefore new claims 34 and 35 meet 35 U.S.C. §112 requirements. On the contrary given the unpredictability of F2, successive generations and progeny, therefore claims 19 and 30 are canceled.

If Examiner or its Supervisor are interested in further discussing this subject, Assignee, Limagrain Genetics Grande Cultures is willing to meet with them at their convenience."

* * * * *

Applicant respectfully submits that at the time the application was filed, applicant was in possession of at least six hybrids as identified in Tables 1 and 2 of the application. Due to the very nature of a corn breeding program, applicant was in possession of several different hybrids containing RAA1 as a parental line.

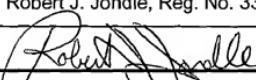
Applicant has amended claim 11 as suggested by the Examiner and canceled claims 12-16, 19, 26-27 and 30 in favor of new claims 34-47. Withdrawal of this rejection is respectfully requested.

Claims 11-16, 19 and 30 are rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Bergemann (U. S. Patent 5,633,429 filed December 1997). Applicant has canceled claims 12-16, 19 and 30. Applicant submits there are numerous differences between the '429 patent and the present invention. Some of the differences include the days from emergence to 50% of plants in silk or pollen, the anther color and the row alignment. The days from emergence to 50% of plants in silk is 80 in the present invention while it is 77 in the '429 patent. The days from emergence to 50% of plants in pollen is 80 for the present invention and 76 for the '429 patent. Anther color for RAA1 is light pink as compared to yellow for the '429 patent. Also, the row alignment of the kernels on the ear is slightly curved for RAA1 but straight for the '429 patent. Additionally, Applicant would like to point out that it is clear from the '429 patent that all hybrids having LH227 as a parental line show an important susceptibility to root lodging while hybrids having RAA1 as a parental line are resistant. In light of the differences between these two plants, Applicant respectfully requests withdrawal of this rejection.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Amended Claims with markings**

to show changes made."

In view of the above amendments and remarks, it is submitted that the claim satisfies the provisions of 35 U.S.C. §§102, 103 and 112 and is not obvious over the prior art. Reconsideration of this application and early notice of allowance is requested.

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Attachments: Marked-Up Copies of Claims

AMENDED CLAIMS WITH MARKINGS TO SHOW CHANGES MADE

1. (ORIGINAL) Seed of corn inbred line designated RAA1, representative seed of said line having been deposited under ATCC Accession No. _____.
2. (ORIGINAL) A corn plant, or parts thereof, produced by growing the seed of claim 1.
3. (ORIGINAL) Pollen of the plant of claim 2.
4. (ORIGINAL) An ovule of the plant of claim 2.
5. (ORIGINAL) A corn plant, or parts thereof, having all of the physiological and morphological characteristics of the corn plant of claim 2.
- B1*
6. (CURRENTLY AMENDED) The corn plant of claim 2, wherein said plant further comprises a genetic factor conferring male sterility is detasseled.
7. (ORIGINAL) A tissue culture of regenerable cells from the corn plant of claim 2.
- B2*
8. (CURRENTLY AMENDED) The tissue culture according to claim 7, wherein the cells or tissue culture of regenerable cells being from a tissue is selected from the group consisting of leaves, pollen, embryos, roots, root tips, anthers, silks, flowers, kernels, ears, cobs, husks, and stalks.
9. (CURRENTLY AMENDED) A corn plant regenerated from the tissue culture of claim 7, wherein the regenerated plant is capable of expressing has all the morphological and physiological characteristics of inbred line RAA1, representative seed of said line having been deposited under ATCC Accession No. _____.
10. (PREVIOUSLY AMENDED) A corn plant with all of the physiological and morphological characteristics of corn inbred RAA1, representative seed of said line having been deposited under ATCC Accession No. _____.
- B3*
11. (CURRENTLY AMENDED) A method for producing a an F1 hybrid corn seed comprising crossing a first inbred parent corn plant with a second inbred parent corn plant and harvesting the resultant hybrid corn seed, wherein said first inbred parent corn plant or second said said second parent corn plant is the corn plant of claim 2.
12. (CANCELED) A hybrid corn seed produced by the method of claim 11.
13. (CANCELED) A hybrid corn plant, or parts thereof, produced by growing said

hybrid corn seed of claim 12.

14. (CANCELED) A corn seed produced by growing said hybrid corn plant of claim 13 and harvesting the resultant corn seed.

15. (CANCELED) An F₁ hybrid hybrid seed produced by crossing the inbred corn plant according to claim 2 with another, genetically different corn plant.

16. (CANCELED) A hybrid corn plant, or its parts, produced by growing said hybrid corn seed of claim 15.

17. (CANCELED) A method for producing inbred corn seed RAA1, representative seed of which have been deposited under ATCC Accession No. _____, comprising:

- a) planting a collection of seed comprising seed of a hybrid, one of whose parents is inbred RAA1, said collection also comprising seed of said inbred;
- b) growing plants from said collection of seed;
- c) identifying inbred parent plants;
- d) controlling pollination in a manner which preserves the homozygosity of said inbred parent plant; and
- e) harvesting the resultant seed.

18. (CANCELED) The process of claim 17 wherein step (c) comprises identifying plants with decreased vigor.

19. (CANCELED) A method for producing a RAA1-derived corn plant, comprising:

- a) crossing inbred corn line RAA1, representative seed of said line having been deposited under ATCC accession number _____, with a second corn plant to yield progeny corn seed; and
- b) growing said progeny corn seed, under plant growth conditions, to yield said RAA1-derived corn plant;
- c) crossing said RAA1-derived corn plant with itself or another corn plant to yield additional RAA1-derived progeny corn seed;
- d) growing said progeny corn seed of step (c) under plant growth conditions, to yield additional RAA1-derived corn plants; and
- e) repeating the crossing and growing steps of (c) and (d) from 0 to 7 times

to generate further RAA1-derived corn plants.

20. (CANCELED) A RAA1-derived corn plant, or parts thereof, produced by the method of claim 19, said RAA1-derived corn plant expressing a combination of at least two RAA1 traits selected from the group consisting of: a relative maturity of approximately 90 to 100 days, excellent seedling vigor, early pollen shed, excellent brittle stalk resistance, excellent husk cover, above average stay green and adapted to the Central Corn Belt, Northeast, Southeast, Northcentral, Southcentral, Southwest or Western regions of the United States.

21. (CANCELED) The method of claim 19, further comprising:

- c) crossing said RAA1-derived corn plant with itself or another corn plant to yield additional RAA1-derived progeny corn seed;
- d) growing said progeny corn seed of step (c) under plant growth conditions, to yield additional RAA1-derived corn plants; and
- e) repeating the crossing and growing steps of (c) and (d) from 0 to 7 times to generate further RAA1-derived corn plants.

22. (CANCELED) A further RAA1-derived corn plant, or parts thereof, produced by the method of claim 21.

23. (CANCELED) The further RAA1-derived corn plant, or parts thereof, of claim 22, wherein said further RAA1-derived corn plant, or parts thereof, express a combination of at least two RAA1 traits selected from the group consisting of: a relative maturity of approximately 90 to 100 days, excellent seedling vigor, early pollen shed, excellent brittle stalk resistance, excellent husk cover, above average stay green and adapted to the Central Corn Belt, Northeast, Southeast, Northcentral, Southcentral, Southwest or Western regions of the United States.

24. (CANCELED) The method of claim 19, still further comprising utilizing plant tissue culture methods to derive progeny of said RAA1-derived corn plant.

25. (CANCELED) A RAA1-derived corn plant, or parts thereof, produced by the method of claim 24, said RAA1-derived corn plant expressing a combination of at least two RAA1 traits selected from the group consisting of: a relative maturity of approximately 90 to 100 days, excellent seedling vigor, early pollen shed, excellent brittle stalk resistance,

excellent husk cover, above average stay green and adapted to the Central Corn Belt, Northeast, Southeast, Northcentral, Southcentral, Southwest or Western regions of the United States.

26. (CANCELED) The corn plant, or parts thereof, of claim 2, wherein the plant or parts thereof have been transformed so that its genetic material contains one or more transgenes operably linked to one or more regulatory element, wherein said transgene comprises an insect resistance gene or a herbicide resistance gene.

27. (CANCELED) A method for producing a corn plant that contains in its genetic material one or more transgenes, comprising crossing the corn plant of claim 2 with either a second plant of another corn line, or with a non-transformed corn plant of the line RAA1, representative seed of said line having been deposited under ATCC Accession No. _____ so that the genetic material of the progeny that result from the cross contains the transgene(s) operably linked to a regulatory element.

28. (CANCELED) Corn plants, or parts thereof, produced by the method of claim 27.

29. (CANCELED) A corn plant, or parts thereof, wherein at least one ancestor of said corn plant is the corn plant of claim 2, said corn plant expressing a combination of at least two RAA1 traits selected from the group consisting of: a relative maturity of approximately 90 to 100 days, excellent seedling vigor, early pollen shed, excellent brittle stalk resistance, excellent husk cover, above average stay green and adapted to the Central Corn Belt, Northeast, Southeast, Northcentral, Southcentral, Southwest or Western regions of the United States.

30. (CANCELED) A method for developing a corn plant in a corn plant breeding program using plant breeding techniques which include employing a corn plant, or its parts, as a source of plant breeding material comprising: obtaining the corn plant, or its parts, of claim 2 as a source of said breeding material and wherein plant breeding techniques are selected from the group consisting of: recurrent selection, backcrossing, pedigree breeding, restriction fragment length polymorphism enhanced selection, genetic marker enhanced selection, and transformation.

31. (CANCELED) The corn plant breeding program of claim 30 wherein plant

breeding techniques are selected from the group consisting of: recurrent selection, backcrossing, pedigree breeding, restriction fragment length polymorphism enhanced selection, genetic marker enhanced selection, and transformation.

32. (CANCELED) A corn plant, or parts thereof, produced by the method of claim 30.

33. (CANCELED) The corn plant of claim 5, further comprising a single gene conversion where the gene confers a characteristic selected from the group consisting of: male sterility, herbicide resistance, insect resistance, resistance to bacterial, fungal or viral disease and corn endosperm or quality.

34. (NEW) A hybrid corn seed wherein at least fifty percent of its genetic material originates from the pollen of claim 3.

35. (NEW) A hybrid corn seed wherein at least fifty percent of its genetic material originates from the ovule of claim 4.

36. (NEW) A method of producing a transgenic corn plant comprising transforming the corn plant of claim 2 with a transgene wherein the transgene confers a characteristic selected from the group consisting of: herbicide resistance, insect resistance, resistance to bacterial disease, resistance to fungal disease, resistance to viral disease, male sterility and corn endosperm with improved nutritional quality. *4/20/01*

37. (NEW) A transgenic corn plant produced by the method of claim 36.

38. (NEW) A method of producing an herbicide resistant corn plant comprising transforming the corn plant of claim 2 with a transgene that confers herbicide resistance.

39. (NEW) An herbicide resistant corn plant produced by the method of claim 38.

40. (NEW) A method of producing an insect resistant corn plant comprising transforming the corn plant of claim 2 with a transgene that confers insect resistance.

41. (NEW) An insect resistant corn plant produced by the method of claim 40.

42. (NEW) A method of producing a disease resistant corn plant

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comprising transforming the corn plant of claim 2 with a transgene that confers disease resistance.

43. (NEW) A disease resistant corn plant produced by the method of claim 42.

44. (NEW) A method of producing a corn plant with decreased phytate content comprising transforming the corn plant of claim 2 with a transgene encoding phytase.

45. (NEW) A corn plant with decreased phytate content, produced by the method of claim 44.

46. (NEW) A method of producing a corn plant with modified fatty acid or carbohydrate metabolism comprising transforming the corn plant of claim 2 with one or more transgenes encoding a protein selected from the group consisting of stearyl-ACP desaturase, fructosyltransferase, levansucrase, alphaamylase, invertase and starch branching enzyme.

47. (NEW) A ^{transgenic} corn plant produced by the method of claim 46.

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